Forest Disease & Insect Conditions in the Northeast —1958

by Paul V. Mook & W. E. Waters

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RALPH W. MARQUIS, DIRECTOR

Foreword

THIS annual summary is compiled from the items submitted seasonally to the Northeastern Forest Experiment Station and published in the NORTHEASTERN FOREST PEST REPORTER; pertinent material in the COOPERATIVE ECONOMIC INSECT REPORT, and the many informal reports of unusual occurrence of forest insects and diseases received throughout the year by the Northeastern Station's Forest Insect and Disease Laboratories. These sources are supplemented by observation and participation in special surveys by members of the Laboratory staffs.

Early detection and prompt reporting of noticeable insect and disease activity is a vital part of the effort to reduce timber losses to a minimum and thus realize a tangibly greater share of the potential productivity of our forests. To the alert and informed field observers and the organizations they represent, grateful acknowledgment is made for their contributions to this report.

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Major Forest Diseases

CERTAIN minor diseases were prominent this year, probably a reflection of the influence of the abundant and well-distributed rainfall that occurred throughout the growing season. Some of these minor diseases can become bad actors when favorable conditions for their development and spread occur. They are of minor importance only because ideal conditions for their development are usually absent.

In general, foliage diseases were more abundant this year than usual, as exemplified by the widespread occurrence, abundance, and severity of sycamore anthracnose. Rusts were abundant. The fairly low infection of white pines by blister rust demonstrated the effectiveness of control by present methods. However, first-year pine infections are easily overlooked, and it is possible that more blister rust infection of pines occurred than may be realized.

The 1957 drought, severe over much of the Northeast, also influenced the 1958 disease situation through its "carry-over effect". Dutch elm disease showed an alarming increase during the year. In some respects this is surprising because wilt diseases are usually more conspicuous during hot, dry periods than during cool, wet seasons. A look backward shows that the after-effects of the 1957 drought increased root mortality and perhaps provided favorable conditions for an increase of its insect vector.

Root mortality caused by the drought was probably greater than generally realized. And this root mortality is believed to have resulted in increased tree mortality by certain root rots and tree diebacks. Not only would greater than normal root mortality adversely affect trees infected by root rots, but dead roots and rootlets also provide entrance for various soil-inhabiting root pathogens. So, in the future, look out for even more root rot trouble.

Rusts

Weather favorable for rust development prevailed throughout the 1958 growing season--perhaps the most favorable of the past several years. Ample rains, with extended periods of high humidity, are necessary for spore formation and germination of the rust fungi. In general, 1958 provided these conditions.

Blister rust (Cronartium ribicola) control work[1] was conducted in 11 States, 5 National Forests, and 2 National Parks. A total of 2¼ million Ribes plants were destroyed, while 195,000 acres were intensively worked. An additional 231,000 acres of premaintenance area and 1,270,000 acres on maintenance were examined and found satisfactory without intensive eradication work. An estimated 100,000 acres of control area will be placed on maintenance.

Chemicals were used more extensively, with good results. Invert 2,4,5-T appears to have certain advantages over regular 2,4,5-T, and will be tested more thoroughly in 1959. Back-pack power mistblowers show excellent promise for treating the more inaccessible concentrations of Ribes. Acti-dione will be tested extensively this winter and next summer. This is a promising chemical for eradication of active blister-rust cankers on infected white pines.

Aeciospores were generally abundant, and only a few localities reported medium-to-light infection. In the Northeast, new infections of pine were generally of low incidence, as may be expected with more than 90 percent of the control area on a maintenance basis.

The Gymnosporangium rusts.--Early season weather conditions were especially suitable for these rusts. Telial stages were very prominent and sporidia developed in abundance. By the latter part of June, aecial occurrence on alternate hosts was widespread and comparatively abundant. Maine reports these rusts as generally heavy on hawthorn, juniper, serviceberry, chokeberry, and occasionally mountain ash.

Other rusts.--Coleosporium asterum (C. solidagihis), usually noted on hard pines from widely separated localities throughout the Northeast, was reported less often than usual. It was reported on red pines from Vermont; in addition, aecia of rusts occurred on hard pines in New Hampshire and New York. Maine reported C. asterum as heavy in a red pine plantation in Redfield for both 1957 and 1958. Puccinia sp. were noted in Pennsylvania, New York, and New Hampshire--the species from Pennsylvania being P. coronata on buckthorn.

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[1] Based on information provided by U. S. Forest Service, Region 7 headquarters, from their summary of 1958 blister rust control work. Their summary includes work in the Appalachian Mountains as far south as North Carolina, and it was not feasible to separate out the data for the Northeastern States alone.

Ash leaf rust (Puccinia sparganioides) was locally abundant near the salt marshes of New Hampshire, but the dearth of other reports indicates this rust may have been less abundant than usual during 1958. It was of little consequence in the coastal area of Maine, although the inoculum appears to be building up on cord and marsh grasses (Spartina sp.).

Chrysomyxa cassandrae was reported on red spruce from New Hampshire, but doing little damage. On the Lebanon State Forest, in New Jersey, localized spots of fairly large shortleaf pines were seriously trunk-cankered by Cronartium comptoniae. Also in New Jersey, C. fusiforme was observed killing small loblolly pines, 3 feet or less in height; while large trees in the same vicinity showed few or no signs of infection. Maine reports Puccinia grossulariae (?) cluster cup rust abundant on wild currants in northern Aroostook County.

Foliage Diseases

For convenience, foliage diseases are discussed as various groups. There is considerable overlapping among these groups and some are ill-defined. The anthracnoses, for example, form a heterogeneous mixture, which defies meaningful definition. One dictionary says, "a necrotic plant disease with restricted lesions"; while this is a poor definition, it is as good as any we have. There are at least 10 genera of fungi causing the so-called anthracnoses; however, with forest trees the term is more or less limited to diseases caused by Gnomonia and Gloeosporium species.

The anthracnoses.--The year 1958 was an exceptionally severe one for sycamore anthracnose (Gnomonia veneta), which occurred throughout the Northeast and was reported as unusually heavy from many localities. For example, New Jersey reported it as "causing defoliation and twig blighting to a degree unseen in the previous 10 years." Pennsylvania reported sycamore anthracnose as causing the loss of two sets of leaves. Inquiries concerning the disease were received through most of August, when affected trees still look very rugged.

Recommended control for sycamore anthracnose is usually spraying with Bordeaux mixture, with PMAS (organic mercury), or with Zineb. Three applications are advocated; the first as buds start to swell, the second when buds break open, and the third about 7 days later. Sanitation by burning or composting affected leaves is advised, as is also pruning of residual twig and branch infections. In the Annual Proceedings (1957) of the Meeting of the New Jersey Federation of Shade Tree Commissions, a one-shot spray was

reported as giving very encouraging results. PMAS (Phenyl mercuric acetate) was used as a bud-break spray at the rate of 1 pint per 100 gallons for hydraulic sprayers, or 5 pints per 100 gallons for mist blowers. This was reported as more effective than 3 applications of Bordeaux mixture.

As sycamore anthracnose was so much more destructive than other anthracnoses and exceptionally severe this year, 1958 provided a severe test for control measures. We would welcome reports on how effective control measures were this year, what spray materials were outstanding, and what spray schedules gave the best control.

Other anthracnoses were also more abundant than usual. Oak anthracnose (Gnomonia veneta) was active in nine states from Maine and Vermont to Maryland and West Virginia. White oak was hardest hit. Pennsylvania reported Gloeosporium apocryptum cultured from maple, and a hickory heavily infected by Gnomonia caryae. Several states noted ash anthracnose (Gloeosporium aridum). Massachusetts reported Gloeosporium spp. from a number of hosts, including ash, apple, elm, magnolia, and red, sugar, and Norway maples, mountain ash, quaking aspen, and horsechestnut.

Leaf spots and blotches.--Phyllosticta sp. (probably minima) was rather abundant throughout the Northeast, particularly on red maples, although its damage was negligible. Vermont reported Rhytisma acerinum was severe on maples; New Hampshire reported this disease on red maple, and its close relative, R. punctatum, on striped maple, although neither was found on sugar maple.

Leaf spots caused by rusts were abundant. Ash leaf rust (Puccinia sparganioides) was cited as locally abundant in New Hampshire, though 1958 was not a bad year for this rust. According to reports from Maine and New Hampshire, Gymnosporangium sp. caused leaf spots on a number of its alternate hosts. Poplar rust, caused by Melampsora sp., was reported from Maryland and New York.

There were reports of a number of miscellaneous leaf spots. These included one from Pennsylvania of a rather heavy infection of elm by Gnomonia ulmea; a report of Entomosporium sp. on hawthorn from Massachusetts and New York; of Marssonia juglandis on black walnut in Pennsylvania; of Taphrina sp. leaf blisters on red, black, and white oaks from Massachusetts; of T. carnea on yellow birch from New York; of Macrophoma candollei causing severe leaf casting of boxwood in Amherst, Mass.; and of Pestalotia and Phyllosticta leaf spots on Rhododendron from Massachusetts.

Powdery mildews were locally abundant in scattered Northeastern localities. In early September, Maine reported Microsphaera alni as heavy on red oak reproduction south of Wiscasset.

Shoot and leaf blights.--The willow blight complex, caused by one or both of Fusicladium saliciperdum + Physalospora miyabeana, was more active than it has been for several years. It was widespread, fairly abundant, but of scattered severity. The disease was severe in parts of Massachusetts and New York; Maine reported it as locally abundant in the southern part of the State, especially on lower parts of trees. The Fusicladium stage seemed to be more common than the Physalospora part of the complex. The localized severity of the disease appears to depend to a large degree on the species and variety of the willow host--at least this was true of observations made in parts of Maine and New Hampshire.

Several other diseases that produce shoot and leaf blights were conspicuous during 1958. Because of its severity this year, anthracnose of sycamore (Gnomonia veneta), already mentioned, resulted in more shoot blight than is usual. Leaf and shoot blight of aspen (Napicladium tremulae = Fusicladium radiosum) was abundant in the Northeast and notable in its local severity in widely scattered spots. Horsechestnut leaf blotch (Guignardia aesculi) was surprisingly light, in view of the abundance and frequency of rainy periods throughout the season. Some severe infections were noted, but these were spotty. The disease became more common as the season advanced and leaf fall became imminent. Maine reported the disease as heavy in the northern coastal area, with trees appearing their worst around mid-September.

Localized reports concerning Botrytis blight and shoot blight (Diplodia pinea) were received from Maine and Pennsylvania, respectively. The former was reported killing shoots of hemlock near Acton, and causing a shoot blight of white spruce in the Augusta and Boothbay areas, apparently in association with late frost injury. Blighted tips of Norway and blue spruce in Augusta and Cornish were similarly affected. Pennsylvania reported infections of Diplodia pinea on pole-sized Scotch and red pines. Young-to-mature white pine in Berks and Dauphin Counties were infected: the blight was also found at Hecla, Pa. Chestnut blight Endothia parasitica) was more conspicuous in 1958 than usual. Reports were received from New York, southern Maine, and New Hampshire, and Massachusetts of chestnut sprouts being hard hit by the disease.

Nursery And Plantation Diseases

Damping-off diseases of seedlings were frequently encountered in Pennsylvania. The State Nursery at Essex Junction, Vt., experienced trouble with dying 2-year-old Norway spruce and red pine seedlings. This disease complex is now under investigation.

Among plantation diseases, one of the most serious is Fomes annosus root rot, whose importance justifies its presentation under a separate heading. Adelopus gaumanni and Rhabdocline pseudotsugae caused trouble in Douglas-fir plantings in New York, Connecticut, Vermont, and Pennsylvania. These leaf-cast fungi attack their host wherever it grows in the Northeast, but the abundance of the two diseases is rather variable. Vermont reported Lophodermium needle blight on pine as severe in some areas. In older plantations, spruce canker (Cytospora kunzei) was reported on hemlock and Japanese larch, as well as on various spruces. It occurred throughout the Northeast.

Cankers

Fungi causing stem cankers, although dependent on favorable weather for spread, spore germination, and host infection, are mostly perennial; therefore reports and observations of the better-known cankers are apt to be repetitious. The following were reported during 1958, but for distribution records and other details, the tabulated summary (table 1) should be consulted: Dothichiza canker (D. populea); Eutypella canker (mainly E. parasitica); pit canker of elm; Strumella canker (S. coryneoidea); Nectria canker (N. galligena); Septoria canker (S. musiva); and black knot (Dibotryon morbosum). Chestnut blight, Cytospora, and Tympanis cankers have already been mentioned under foliage or plantation diseases.

During the year fewer reports than usual were received of bleeding canker (Phytophthora cactorum) of maple. Whether this signifies a reduction in incidence for 1958 is not known. A bleeding canker of unknown cause occurring near the base of Douglas-firs has been brought to our attention. Affected trees were in the vicinity of Bristol, Conn. Another basal canker of unknown cause--this one affecting eastern white pine--has been noted in New York State.

Some wood-rotting organisms cause stem cankers of trees. Due to the nature of the pathogen, such cankers are usually classed in some other grouping of tree diseases,

and therefore they are often overlooked as canker-forming organisms. Some of the wood rotters that produce cankers are:

- Polyporus hispidus, which affects oaks and forms large, elongated, irregular sunken areas, often with conspicuous ridges of callus extending below the annual fruiting body. These are distinctive enough so that trees infected by P. hispidus are easily spotted during the period when fruiting bodies are absent. The fungus, mostly southern in distribution, is found mostly south of New England. Oaks on the Lebanon State Forest of New Jersey have a large incidence of such cankers. An even larger number of oaks in the same locality are infected by

- Fomes everhartii, which produces a rather distinctive gnarly swelling where the fruiting body of the fungus occurs. Some oaks were observed that had a half dozen sporophores, each with its attendant canker. Trees often break at these cankered areas, and several such breaks were observed. F. everhartii also was noted in rather high incidence on oaks on the Massabesic Experimental Forest in southern Maine.

- Fomes connatus commonly occurs on maples; it produces a roughened, enlarged canker, often with a sunken area in the immediate vicinity of the conk. Various degrees of ridged callus may be present. Cankers of this fungus usually appear within 3 or 4 feet of the ground.

- Fomes igniarius sometimes produces an enlarged, roughened, canker-like swelling where it fruits, but this is an exception rather than the rule; and it occurs more often on a hardwood than a softwood host.

- Other wood rotters that sometimes produce cankers are: F. igniarius var. laevigatus on (yellow birch): Polyporus glomeratus (mainly on maple); and Poria obliqua (on birches, particularly yellow birch). These fungi, however, are not very reliable canker producers, and frequently they occur without cankering their hosts. Fomes fomentarius, F. pini, and F. robustus are also reported at times as canker-forming.

All the above canker-forming wood rotters are widespread throughout the Northeast except P. hispidus and F. robustus; and all were observed or reported during 1958, except F. robustus.

Many rusts produce stem cankers, including Cronartium ribicola, C. cerebrum, C. comptoniae, and Gymnosporangium biseptatum. Observations on rust cankers in the Coastal Plain region of New Jersey during 1958 were interesting--"hot spots" of fairly large shortleaf pines were found badly stem-cankered by C. comptoniae. Here, also, many Atlantic white-cedars had stem cankers caused by G. biseptatum. C. fusiforme was found killing a number of loblolly pine seedlings by stem-girdling cankers. No trunk cankers like those common in the deep South were found on the larger host trees. Perhaps the absence of stem cankers on large loblolly pines indicates a fairly recent introduction of the pathogen into this region.

Finally, a totally different type of fungus--a wood stainer (Ceratocystis fimbriata f. platani)--causes cankers on London plane trees. These cankers are darker, sunken or depressed areas on the yellow-greenish bark of the host. This fungus has killed many street and ornamental trees in the metropolitan areas of Philadelphia, Baltimore, and Washington, D.C. It also occurs on native sycamores, but native trees most infected are those near streams that are trunk-injured by floating debris or ice during spring floods. A survey several years ago revealed about 2 percent, or less, infection of native sycamores around Philadelphia and in the mountainous regions near the junction of Maryland, Virginia, and West Virginia. Still, cankers on native trees are usually small and relatively inconspicuous, and it is believed that many native trees may eventually outgrow such infections.

Root Rots

Many new locations for Fomes annosus root rot were reported during 1958. Two locations were in Columbia County, New York. The fungus was also found on pitch, Scotch, red, and white pines in plantations south of Saratoga Springs, N. Y. A small-scale survey by the Bureau of Forest Pest Control of the New York Conservation Dept. revealed F. annosus in nine counties: Albany, Allegany, Columbia, Cayuga, Lewis, Oneida, Ontario, Rensselaer, and Westchester. All plantations were red pine except for one of white pine. A more intensive survey is expected to be made in 1959.

Pennsylvania reported F. annosus from a 40-year-old white pine plantation near Mt. Alto. West Virginia personnel cultured the organism from dead and dying red cedars in an area originally located in 1957. New infections were located in Massachusetts and New Hampshire. A study in south-

ern New Jersey revealed infections on the following hosts: Pinus rigida, P. echinata, P. resinosa, P. strobus, P. Ponderosa, P. taeda, P. sylvestris, P. banksiana, European larch (Larix decidua), Pseudotsugae menziesii, Juniperus virginiana, and Picea abies. Some of these infected hosts are new reports from New Jersey, and may be new host records for the eastern United States.

Armillaria mellea is common throughout the Northeast; it occurs as a "pathogen of opportunity." Its importance as a pathogen or saprogen is debatable, and there are conflicting viewpoints on its status. Few reports on the fungus were received during 1958. Massachusetts reported it from infected oak roots, growing under marginal conditions. Presumably drought triggered the final decline and death of such trees. It is believed that the same may be said for the death of many roadside sugar maple trees. A. mellea was very common on dead beech, maple, and yellow birch trees 2 years after they had been poisoned. The incidence of such infections was very high: three-quarters or more of the poisoned trees or their stumps were infected. The organism was readily located by its characteristic rhizomorphs, mycelial fans, and by its fluorescence when infected wood samples were examined in the dark. Apparently the fungus occurred mainly as surface growth in the bark-cambial region and had not penetrated the underlying wood more than a fraction of an inch, at least in dead trees poisoned 2 years previously.

Other miscellaneous root rots were reported. These include the finding of fruiting bodies of Corticium galactinum, Poria subacida, and a Coniophora sp. on stump roots in a 40-year-old white pine plantation in southern New Jersey, now being harvested.

Heart Rots

Some of the more interesting heart rots have already been mentioned in the section "Cankers". In addition, Polyporus spraguei, P. obtusus, and P. gilvus were common on oaks on the Lebanon State Forest of New Jersey. Sterile conks of Poria obliqua were occasionally seen on birches of the Massabesic Forest in Maine, and the same fungus seemed unusually common on yellow birch in the Hubbard Brook Experimental Forest in New Hampshire. Steccherinum (=Hydnum) septentrionale is common throughout the Northeast; Maine reported it as unusually common on sugar maple around Farmington. Together with other heartrots, this fungus seems a possible influence in the dieback complex of sugar maple.

Witches' Broom

The common witches' brooms that are widespread in the Northeast showed up in their usual abundance during the past season. Among them were brooming of wild cherry by Taphrina cerasi; Vaccinium witches' broom, caused by the rust Calyptospora goeppertiana; a witches' broom of Atlantic white-cedar (Gymnosporangium ellisii), common from the New Jersey coastal plain southward but also reported from the West Appleton area in Maine; and the rust-caused witches' broom of balsam fir and eastern spruces, frequently observed.

Of greater interest were two witches' brooms of unknown cause. One was observed on at least two species of willow in south-central New Hampshire. As far as known, the common fungi causing most brooming, viz., Taphrina and rusts, have not been reported as a cause of brooming on willow. The other witches' broom was observed on pitch and shortleaf pine, particularly the latter, in the Coastal Plain area of New Jersey. Here, very small clusters, or tufts, of leaves on small trees were infested by a scale insect, with ants active among them. These small tufts of leaves appeared as if they might be the initial stages of large conspicuous foliage brooms seen in many of the larger trees in the area. Also, a large, old shortleaf pine was observed with clusters of leaves developing from adventious buds arising from a small swelling or incipient canker on the tree trunk. Here too ants were intimately associated with a scale insect.

It would be interesting to find out whether the large foliage brooms on large trees resulted from such localized insect activity It might be that these sites serve as infection courts for rust infections such as Cronartium comptoniae. Possibly pine brooms result from a complex of ants-scale-rust, and as such seem worthy of investigation.

Wilts

Wilt diseases of greatest general concern were Dutch elm disease (Ceratocystis ulmi), Verticillium wilt (V. albo-atrum), and oak wilt (Ceratocystis fagacearum). The first two occurred abundantly throughout the region, while oak wilt was fairly well confined to known infected areas.

Dutch elm disease.--An upsurge in the number of cases of Dutch elm disease was reported. Delaware reported losses equalling last year's, with an alarming number of infected trees in Kent and Sussex Counties. The Massachusetts Shade Tree Laboratories had received, by the last of June, a greater number of samples than for any previous year. Maine

found double the number of towns where the disease occurred in 1958, over the number found during the period 1952-57.

The disease was found for the first time on Nantucket Island, although previously it had been noted on Martha's Vineyard. Wilting elms were being noticed throughout West Virginia. Localized "infection pockets" occurred throughout the Northeastern States. This increase in Dutch elm disease apparently resulted from the 1957 drought, which provided very suitable conditions for the insect vector of the disease.

Verticillium wilt (V. albo-strum).--This was widely reported and appeared to be worse than usual. Perhaps the drought-induced root mortality accentuated all the vascular wilts. From Vermont came word of an increase in disease intensity. New Jersey reported Verticillium as a continuing problem necessitating the removal of many decrepit trees because of their hazard to people and vehicles. Isolations of Verticillium were obtained from Japanese maple in Massachusetts and Chinese chestnut in Pennsylvania, as well as elsewhere from its more prosaic hosts.

Maine presents the following comparison of 1957 and 1958 confirmations from cultured elm twig samples:

Year	Number of samples	Dutch elm disease	Verticillium	Cephalosporium
1957	372	240	12	34
1958	494	273	30	29

It is interesting to note that percentage, at least, of Dutch elm disease and Cephalosporium confirmations decreased during the past wet summer while Verticillium increased twofold.

Oak wilt (Ceratocystis fagacearum).--The following summary of the oak wilt situation for the three states covered in our surveys is incomplete; the only full-year summary or report on oak wilt at hand was from West Virginia. Accordingly, data from Pennsylvania and Maryland cover only part of the year.

Maryland.--A midseason report from Maryland stated that 26 spots had been observed in Washington and Allegany Counties, a mountainous area between Hagerstown and Cumberland.

Pennsylvania.--At midseason, Pennsylvania reported that bad weather had delayed their oak wilt air-flight survey. No unusual infections had been found, and it was too early for disease trends to be manifested. A report received about October 1 told of 335 oak wilt areas located in 1958, 70 being re-treatments of previously known areas which had newly infected trees. Of the 335 areas, 87 were single-tree infections.

West Virginia.--The following data have been abstracted from a report by W. H. Gillespie and F. W. Craig titled "Report of the 1958 West Virginia Oak Wilt Program" and issued by the West Virginia Department of Agriculture.

Trees infected with wilt were located in 35 counties; these were first reports for two counties. They bring the state total up to 46 counties where oak-wilted trees have been found. However, this past year, oak wilt was not found in 11 counties where it had been found previously. For the past 3 years, the number of counties in which oak wilt occurred has remained about the same. It was 35 counties for 1956; 36 for 1957; and 35 for 1958.

Other aspects of the West Virginia oak wilt situation in 1958 are not so encouraging. During 1958, a total of 1,448 oak trees suspected of being wilted were processed by the deep-girdle method. This is 559 more trees than for 1957. But even though the 868 new disease centers located in 1958 were 187 more than in 1957, it was 12 less than the 880 located in 1956.

Undoubtedly 1958 was a bad year for oak wilt in West Virginia, just as it seems to have been for other wilt diseases in the Northeast. It is believed, however, that certain conditions might have operated to inflate the number of infected trees reported in 1958. For example, during late 1957, wilt-survey workers realized that they had missed a number of infected trees in heavily infected areas of West Virginia. During the year a number of trees were processed just as they started to wilt. These so-called "August trees", combined with drought conditions and insect damage, complicated air scouting so that the last 1957 aerial survey scheduled for some parts of the State was not made. Thus, trees infected in 1957 would have been discovered in that year if conditions had been more auspicious. This resulted in a number of 1957-infected trees swelling the 1958 totals.

The West Virginia special report states that the deep-girdle method of control, as used in the State, appears to be about 85 percent effective in halting mat production. This equals or betters other methods tried within the State. Also, the deep-girdle method is cited as the cheapest and best control used under West Virginia conditions.

Of the species infected by oak wilt in West Virginia in 1958, 46 percent were black oak (Quercus velutina); 33 percent were northern red oak (Q. rubra); and 18 percent were scarlet oak (Q. coccinea). White oak (Q. alba), chestnut oak (Q. prinus), and scrub oak (Q. ilicifolia) comprised the rest.

Other wilts.--Outstanding other wilts, included a virus disease, Phloem necrosis, were reported from West Virginia. An early season report from Delaware stated that mimosa wilt (Fusarium oxysporum f. perniciosum) was present in Sussex County and increasing in intensity. Typical cultures were isolated from infected trees.

Miscellaneous Ailments And Diseases Of Unknown Cause

Diebacks.--Diebacks of various tree species were widespread in 1958. Some attributing causes were: (1) the 1957 drought and its root mortality after-effects; (2) salt injury, a yearly recurring item; (3) winter injury; (4) wind scorch; (5) frost damage; (6) high water table; (7) adverse environmental and nutritional effects; and (8) various pathogens, including Armillaria and other root rots, Diplodia and Cytospora dieback, etc.

The numerous widespread reports of stagheaded, dieback, and dying trees, especially sugar maples, white pines, and many other severely exposed roadside trees, may well be the result of one or more of the first seven causes listed above. Armillaria mellea root rot acts as a triggering cause in the death of many such declining and weakened trees. Unfavorable environment certainly ranks high as a contributing cause.

Oak mortality (not oak wilt), sweetgum blight, ash dieback, and dead and dying hemlock are still unexplained. Oak mortality has been most often reported from West Virginia, north-central Pennsylvania, and from parts of southern New York, although oaks throughout much of the Northeast have shown considerable amounts of dieback within recent years. Oak troubles, other than oak wilt, were reported from southern New Jersey, Delaware, West Virginia, Maryland,

and Pennsylvania. Oaks of the red oak series are apparently the most severely affected, although West Virginia includes white oak for the 30 counties of the State where oak trouble occurs.

In Maryland, scarlet oaks near Towson, and red, black, and scarlet oaks in the southern part of the state were dying or showing signs of top dieback. One report, however, says that the southern red oak does not seem to be affected. Dead and dying oaks occurred on the George Washington and Jefferson National Forests; 30- to 40-acre dead spots observed on the George Washington. Patches of dead trees, mostly oaks, resulted from the 1957 drought in parts of Pennsylvania, southeastern New York, and Connecticut, especially where such trees grew in shallow soils on stony outcrops.

Sweetgum blight was reported from New Jersey, Delaware, and Maryland. Ash dieback is apparently on the increase throughout much of the Northeast. Dead and dying hemlock were reported from the Cook Forest in Pennsylvania, and from the Massabesic Forest in southern Maine. Dying and dead willows in Massachusetts were attributed to last year's drought, especially as many grew on sandy, hilltop, or hillside sites. There were fewer reports of conifer troubles. But pine mortality was noted near Kennett Square, Pa.; and from New York came reports of the tips of pole-sized red pines turning brown in plantations in the Whetstone Gulf area.

Weather troubles.--The following reports, ascribed to weather effects, were received during 1958. Winter injury to oaks in West Virginia resulted in frost cracks and seams, many of which were fluxing during the summer months. Winter injury was also reported from the Washington Crossing Nursery in New Jersey. Experimental outplantings in New Jersey, originating from southern seed sources, sustained winter injury. Of stocks from seven sources, only those from New Jersey escaped without noticeable damage.

Wind damage was reported from West Virginia. Maine reported a tornado that flattened a strip of forest 19 miles long and averaging $\frac{1}{4}$ mile wide. This occurred in mid-August and extended from Round Pond on the Allegash River to Beavertail Pond in northern Aroostook; salvage was not practical. Leaf scorch is a secondary effect of wind damage, occurring as it does during periods of water stress, combined with rapid air movement.

Frost damage affected trees and shrubs in southern New Jersey. Here a late frost occurred on June 7. Red oak in southern Maine also was damaged by frost, as were tender balsam fir tips in the same general region.

Considerable snow damage was caused by the exceptional amount of snowfall in the coastal region of New Jersey. Atlantic white cedar sustained a great amount of limb breakage. Loblolly pines were also damaged, although breakage from the snow load was generally confined to trees 10 feet high or taller, or those with limbs large enough to accumulate limb-breaking loads. Maine reported snow damage occurring in a young arborvitae plantation, to trees on the edge of a red pine plantation, and in an isolated, thinned, white pine stand.

Other troubles.--White pine needle blight was generally light during the past year, although it was reported as common in southern Maine after August 1. It was severe in parts of New Hampshire. Reports of resinosis of white pine were received from New York. Tree mortality associated with heavy pitch flow at internodes occurred in the Champlain Valley. The condition is also present in the southern tier of counties and at various other localities in New York.

A Cytospora sp. was isolated from willow twigs from Warren County, Pennsylvania. Dwarf mistletoe (Arceuthobium pusillum) is doing considerable damage in the coastal strip of Maine, especially in the Brunswick-Ellsworth region. White pine needle decline, which resembles white pine needle blight but may be different, is being considered separately and is under study by Maine personnel. It occurs in the peninsular coastal region of the State.

An unfavorable environment, often unintentionally or artificially produced, can be damaging. This was illustrated in Massachusetts by the death of young Norway spruce that had been planted too deeply; and in New York State by the death of some 50 acres of black spruce killed by too high a water table, the result of beaver activity.

Pennsylvania reported chlorosis of pin oak shade trees from scattered localities. In Maine, a chlorosis of spruce, fir, red, and white pine was observed in patches up to 2 acres in size. Drought after-effects or nutritional effects may have been responsible.

Terminal bud loss of Scotch pine, especially in the northern part of New York State, is causing concern to many Christmas-tree growers. This bud loss is due to grosbeak feeding. Bird damage to terminal buds of conifers commonly occurs in the Northeast, and is a type of injury that has

been too little appreciated in the past. It results in "cabbage-top" young trees, or excessive bushiness, and superficially it resembles weevil damage, except that dead shephard's-crook leaders are absent. Much grosbeak damage has been mistakenly attributed to weevils.

From Maine comes a report of a condition observed on the Orono, High Head, and Greenbush nurseries in mid-July, characterized by a downward bending of needles in the fascicle about ½ inch out from the sheath. Only white pine seedlings were affected and they recovered later. It was ascribed to an undetermined climatic influence, although midge larvae were collected from some of the affected seedlings. A canker of young red maple, caused by Hymenochaete agglutinans, occurred on the Bartlett Experimental Forest in New Hampshire.

Major Forest Insects

THIS year's favorable conditions for tree growth offset in large measure the adverse effects of last year's severe drought. Growth loss and mortality due to secondary insects were much less than we expected. So was damage by primary pests in general. The unusual abundance and widespread occurrence of several common insects indicated incipient outbreaks, but the major epidemics in the region were carry-overs from 1957. Unfortunately, sufficient data are not available on all of these to predict with confidence the over-all picture for 1959.

Spruce Budworm

Approximately 302,000 acres in northeastern Aroostook County, Maine, were sprayed with DDT by airplane between June 10 and June 20 at a cost approximating 78 cents per acre. Balsam fir and spruce in the treated area had undergone 5 to 9 years of light-to-severe defoliation and, as predicted by the 1957 egg-mass survey, heavy budworm populations were present again in 1958.

The spray was applied by eight modified torpedo bombers (TBM'S) with up to 900 gallons capacity each, and two Stearmans, at a per-acre rate of 1-pound DDT in 1 gallon of oil solution. The planes flew in pairs behind a guide plane. The project was a cooperative undertaking of the Maine Forest Service and the U.S. Forest Service under terms of the Forest Pest Control Act. Additional technical advice was given by B. W. Flieger and staff of Forest Protection Ltd., Campbellton, New Brunswick.

The necessary studies for timing spray application, determining the reduction in budworms, and assessing spray effects on budworm parasites, aquatic insects, fish, and birds were conducted from two field laboratories at Portage and Sinclair. Also, the regular surveys of budworm infestation and the status of budworm parasites in northern Maine were conducted from these field laboratories.

Reduction in budworm populations 10 to 14 days after spraying averaged 96 percent. No reduction in parasitism was noted; in fact, in ratio to host budworms, several parasites showed a moderate increase.

The regular systematic aerial survey from Fort Kent to Greenville in mid-July revealed no heavy defoliation. The most noticeable budworm feeding was on some 150,000 acres around the southwestern periphery of the spray area. Elsewhere, budworm populations and defoliation were much reduced from 1957.

Consideration of the general status of natural control factors, particularly parasites, and a marked decrease in the outbreak in adjacent portions of Quebec and New Brunswick led to the recommendation that no control action be taken in 1959. However, the intensive cooperative survey program will continue.

Balsam
Woolly Aphid

A general survey was made in Vermont by Northeastern Station personnel and E. B. Walker of the Vermont Department of Forests and Parks. It revealed a much greater than expected acreage and volume of fir killed by this highly destructive pest. Infestations currently extend northward to Danville and the Lamoille River drainage. Heavy attack and tree mortality were found throughout the rest of Vermont. Tree mortality due to the aphid is also continuing in spots in the White Mountain National Forest, New Hampshire; and a gradual buildup is reported at locations in Hamilton County, New York.

In coastal areas of Maine, there appears to be a resurgence of twig attack and gout injury.

An intensive survey of the management-study compartments in the Penobscot Experimental Forest, near Bangor, revealed that 10 of the 32 compartments had more than 25 percent of the trees with stem attack. In nearly one-half of all compartments, at least 10 percent of the trees 5 inches d.b.h. and over were infested. An estimated 16 percent of the merchantable-size trees are undergoing some degree of stem attack. Heaviest attacks were recorded in the compartments with more and larger trees, those compartments operated on a selection basis with short cutting cycles. This infestation seriously threatens the research program of the Penobscot Forest.

Pine
Sawflies

The continuing infestation of Virginia-pine sawfly, Neodiprion pratti pratti, in eastern Maryland was surveyed from the air in late May. Approximately 327,000 acres of pine types were defoliated, more than 12,000 acres severely. Around Pisgah and LaPlata, one of the oldest centers of the current outbreak, only traces of feeding were observed. New areas of infestation were reported along the northern edge of the 1957 infestation zone and on the west near Harpers Ferry. On May 8 and 9, a thousand acres of the Beltsville Experimental Forest were sprayed by helicopter to control this pest. Approximately 900 acres were treated with DDT at the rate of 1 pound per acre and 100 acres with a virus spray. Control by both means was excellent, but the slower acting virus permitted some defoliation to occur.

The concurrent outbreak of the pitch-pine sawfly, N. pratti paradoxicus, in southern New Jersey covered over one million acres in 1958. Both pitch and shortleaf pines were attacked, but generally less than in 1957. Parasite studies by personnel of the New Jersey Division of Plant Industry have been conducted for several years, and releases of the chalcid Dahlbominus fuscipennis were made in 1957 and 1958. Recoveries of the parasite have been made at a number of check points, but as yet no evaluation of its effect is possible. In the spring of 1958, the polyhedral virus disease of N. sertifer was tried by the same agency against all larval stages of N. pratti paradoxicus. The mid-instar larvae were susceptible and spread of the disease was observed in field trials.

The European pine sawfly, N. sertifer, was abundant in southern New York and Connecticut and caused serious defoliation locally in eastern Pennsylvania. Good control in

a 5-acre planting of red pine near Kunkletown, Pa., was obtained with a very light virus suspension of 18,000 polyhedra per milliliter per gallon of water applied with a hydraulic sprayer. The spray was applied May 13, and some dead larvae were still stuck on the trees in early August.

Other sawflies were less important this year. The red-pine sawfly, N. nanulus, declined to a very low ebb in northern New York, although noticeable feeding by this pest was reported from Franklin County. The red-headed pine sawfly, N. lecontei, attacked red and jack pine in increased numbers throughout Saratoga, Rensselaer, Lewis, Jefferson, and St. Lawrence Counties, New York. A sawfly (probably N. taedae) was noticeably abundant on young loblolly pines in St. Mary's County, Maryland.

Shoot And Tip Moths

Populations of the European pine shoot moth, Rhyacionia buoliana, were particularly high in Carbon County, Pennsylvania, and at other locations in Pennsylvania, northern West Virginia, western Maryland, New York, and southeastern Connecticut. Direct control measures--clipping infested tips by hand and applying DDT by hydraulic sprayer and fog machine--were attempted on a series of infested blocks of red pine in Garrett County, Maryland, in late June and early July. Results were variable, depending on when the spray was applied. Costs ran as high as 14 dollars per acre. Less stringent (and less expensive) and more effective means of controlling this pest must be devised.

The Nantucket pine tip moth was reported from various sectors of West Virginia, Maryland, Delaware, and New Jersey. It was particularly serious in eastern Maryland and central and southern Delaware, where young loblolly pines have been under severe attack annually. One 30-acre planting of loblolly pine on the Eastern Shore was completely destroyed by the tip moth and associated agents.

Species (?) of Eucosma, as yet unidentified, are causing severe injury to tips and leaders of red, white, and Scotch pines in central New York and Pennsylvania. Leader damage is particularly apparent on Scotch pine in Berks County, Pennsylvania. Specimens of the insect from Scotch pine terminals were reared by Arnold Drooz, Pennsylvania Department of Forests and Waters, and sent to Washington for identification. A taxonomic revision of the group may be in progress.

Miscellaneous Insects On Conifers

The white-pine weevil, Pissodes strobi, as usual was abundant regionwide. In Pennsylvania, damage by closely related P. approximatus in Christmas tree plantings is apparently increasing. Pales weevil, Hylobius pales, injury was prevalent on young seedlings in all states. The spittlebugs, Aphrophora spp., were a nuisance on pines throughout most states in the region. The pine needle miner, Exoteleia pinifoliella, was prevalent again on pitch and shortleaf pines in southern New Jersey. Larch sawfly, Pristiphora erichsonii, was present for the fifth year on Japanese larch near Renova, Pa., while two new sites were infested at Waterville and Emporium, Pa. This sawfly was also reported stripping trees locally at Sorrento, Me.

Balsam needle gall midge, Itonida balsamicola, is causing serious concern to Christmas tree operators in eastern Maine. Numerous branches on red pines at several points in New Hampshire and Maine were killed by the pine gall weevil, Podapion gallicola. Red and black turpentine beetles, Dendroctonus valens and terebrans, generally associated with windthrow, logging injuries, etc., were active at scattered locations in the region. D. terebrans were found heavily infesting living white pines in Pendleton County, West Virginia.

Yellow-headed spruce sawfly, Pikonema alaskensis, is reported increasing in Maine. Pitch pine near Rehoboth, Mass., showed much yellowing due to pine twig gall scale, Matsucoccus gallicola. The red-pine scale, Matsucoccus resinosae, was found in a red pine planting at the Stamford (Conn.) reservoir--12 miles from the main body of infestation. Probably similar spot infestations occur generally in southwestern Connecticut. The pine leaf aphid, Pineus pinifoliae, was a continuing pest in Maine and Vermont. Ips engraver beetles also continued their depredations throughout the region.

Gypsy Moth

This pest was generally at a low level in 1958. Aerial spraying programs completed in the spring were as follows: Pennsylvania--107,000 acres under State contract and 380,000 acres under Federal contract; New York--2,305 acres; Connecticut--10,808 acres; Massachusetts--9,700 acres; Maine --137 acres. Some male moths were trapped at several points in the generally infested areas of New York and in at least one point in New Jersey.

Orange-striped
Oak Worm

The year 1958 was an outbreak year for this pest, which appears sporadically. In Connecticut, where extensive oak stands in the southeastern sectors were severely defoliated, it was the worst year on record. A large portion of Rhode Island was heavily infested. Then too, heavy infestations were reported in southern New Jersey, northern Maryland, and Pennsylvania. A 10-square-mile area of oak in Cumberland County, Pennsylvania, was completely stripped.

Because defoliation occurs late in the season, August and September, this insect is generally not considered serious. It is true that the direct effect on tree growth may be slight. However, indirect effects through increased soil-surface temperatures, decreased moisture, and lack of rain interception might result in rootlet mortality, decreased tree growth, possibly greater fire hazard, and other seemingly unrelated difficulties.

Forest Tent
Caterpillar

In West Virginia, indications of the first outbreak in recent years were reported. Seven areas ranging from 50 to 2,000 acres were noticeably defoliated. Light populations were present also in western Maryland and Pennsylvania. Larvae were found on red and white oaks throughout Adams, Franklin, Cumberland, and Westmoreland Counties, Pennsylvania; some commercial maple sugar bushes in Somerset County were severely defoliated. The parasitic fly, Sarcophaga aldrichi, was abundant in most of the infested areas in West Virginia, presaging a possible decrease in the degree of attack there next year.

Variable Oak Leaf
Caterpillar

New defoliation by this periodic enemy of hardwoods was observed over 1,500 acres near Elkton and Port Deposit, Md. It was noticeably abundant throughout Cecil County, Maryland, and in certain sectors of Delaware. Beech and oaks were stripped locally. Larval feeding was completed generally by early August. Other associated species were also more abundant; these included the walnut caterpillar, yellow-necked caterpillar, and the red-humped oak worm.

Miscellaneous Insects
On Hardwoods

The looper, Phigalia titea, severely defoliated about 2,300 acres of oak-hickory forest in Hardy County, West Virginia, apparently feeding on all species of plants except wild grape. Heavy defoliation by the fall cankerworm, Alsophila pometaria, occurred at spots in northeastern West Virginia and York County, Pennsylvania. Several species of leaf-rolling caterpillars caused moderate-to-severe defoliation of scarlet, red, black, and white oaks in scattered stands in north-central Pennsylvania; two of the species most abundant were identified as Argyrotaxa semipurpurana and A. albicomana. Leaf-rollers were prevalent on a variety of host trees in northeastern West Virginia.

For the second year, a serious infestation of the saddled prominent, Heterocampa guttivitta, caused heavy defoliation of beech on Bald Mountain, New Hampshire. The spiny oak worm, Anisota stigma, infested oaks at higher elevations on the same mountain. A twig pruner, Elaphidion villosum, was abundant on oaks generally in Pennsylvania. The fall webworm, Hyphantria cunea, was reported as a nuisance in New Jersey and Delaware. Injury by the Asiatic oak weevil, Cyrtepistomus castaneus, was common on oaks in Delaware and Maryland; adults caused moderate damage to oak seedlings at Fairland, Md. The gregarious oak leaf miner, Cameraria hamadryadella, was very abundant in sections of Connecticut and Massachusetts.

Local infestations of the maple leaf cutter, Paraclemensia acerifoliella, still persist in Vermont, though generally reduced. In Lewis County, New York, several thousand acres of maple were reported severely defoliated by this insect. Beech scale, Cryptococcus fagi, was found for the first time in Pennsylvania (Pike County). The locust borer, Megacyllene robiniae, was reported seriously damaging black locust in West Virginia.

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Table 1.--The forest disease situation in the Northeast, 1958

Disease	Host	Locality affected	Extent	Degree of infection or damage	Recommended control action
Blister rust	White pine	Regionwide; also portions of Regions 7 & 8[1/]	195,000 acres received intensive control work; 231,000 acres of premaintenance and 1,270,000 on maintenance examined.	Generally heavy aeciospore production. *Ribes* sp. heavily infected when not in control areas. Low incidence of white pine infections where under maintenance.	Ribes eradication; total of 2¼ million *Ribes* sp. destroyed in 1958 in blister rust control work.
Juniper rusts	Primary: Red cedars & dwarf junipers. Secondary: Woody rosaceous plants, including apple, quince, hawthorns, Amelanchier, flowering crabs, etc.	Maine, New Hampshire, Vermont, Massachusetts, New York, Connecticut & New Jersey.	General throughout Northeast where hosts occur together.	Very heavy on dwarf junipers in New England states. Red cedar infections very heavy in certain Me., N.H., Mass., & Conn. localities.	Eradicate juniper hosts near valuable plantings, if practical; spray ornamentals, apples, pears, quinces, with Ferbam, when near infected junipers.
Pine needle rust	Red pine; also other hard pines	Vermont, New Hampshire, & New York.	Scattered	Light	None.

[1/] Data supplied by Blister Rust Control personnel, Regions 7 and 8.

(continued)

Table 1.--(continued)

Disease	Host	Locality affected	Extent	Degree of infection or damage	Recommended control action
Spruce needle rust	Red spruce	New Hampshire (northern)	Very limited	Light no damage	None.
Sweetfern rust	Shortleaf & pitch pines	New Jersey (southern)	Limited	Variable--generally light but spots with severe trunk cankers.	Selective cut of heavily cankered trees. Generally no control needed.
Miscellaneous rusts	Various; mostly hardwoods.	Pennsylvania, New York, New Hampshire, & Maine.	Very limited	Scattered localized reports of *Puccinia* sp. on unimportant hosts.	None.
Anthracnose diseases	Sycamore	Regionwide	Widespread & general.	Exceptionally severe.	For ornamentals and valuable trees spray with PMAS or Zineb.
	Oaks, principally white.	Regionwide	General	Moderate to severe; often of variable severity in scattered localities.	None
	Maples, ash, hickory, & other species. (see text)	Pennsylvania, Maine, New Hampshire, Massachusetts, & Connecticut.	Generally localized.	Generally light.	None
Phyllosticta leaf spot	Red maple	Maine, New Hampshire, & Vermont	Limited localities.	Slight	None.

Elm leaf spot	Elm	Pennsylvania	Occasional or limited.	Slight	None.
Tar spots	Maples	Vermont & New Hampshire	Limited	Locally severe to negligible.	None.
Entomosporium leaf spot	Hawthorn	Massachusetts & New York	Localized	Slight	None.
Poplar leaf rust	Poplars	Maryland & New York	Localized	Slight	None.
Walnut leaf spot	Black walnut	Pennsylvania	Localized	Slight	None.
Leaf blisters	Red, black & white oaks;	Massachusetts, Maine & Conn.	Scattered & localized.	Light	None.
	Yellow birch	New York	Localized	Slight	None.
Powdery mildews	Various unspecified species	Massachusetts	Scattered	Light to moderate	None.
	Red oak	Maine	Wiscasset vicinity	Heavy on seedlings (natural reproduction)	None.
Willow blight & willow scab	Willow	Massachusetts, New York, New Hampshire & Maine	General, but variable	Of scattered severity in parts of Mass., N.Y., & N.H.; locally abundant southern Me.; more severe than usual over much of Northeast.	None. Avoid susceptible species for ornamental plantings.

(continued)

Table 1.--(continued)

Disease	Host	Locality affected	Extent	Degree of infection or damage	Recommended control action
Aspen leaf & shoot blight	Trembling aspen	Regionwide	General, but spotty	Scattered severity; notably severe in spots.	None.
Leaf blotch	Horsechestnut	Regionwide	Scattered	Generally light, becoming moderate to severe near end of season.	Spray ornamentals with Bordeaux, organix mercuries, or Ziram + sanitation.
Shoot blight of pines	Most pines; hard pines more susceptible.	Pennsylvania	Dauphin & Berks County near Hecla, Pennsylvania	Slight (?)	Usually none; spray with Bordeaux.
Botrytis shoot blight	Hemlock & spruces	Maine (southern)	Limited	Slight	None; infection conditioned by frost injury.
Chestnut blight	Chestnut	Regionwide	Widespread	Severe sprout infection; worse than usual.	None feasible.
Damping-off	Conifers	Pennsylvania & Vermont	Probably widespread, but few reports.	Severe	Under investigation.
Leaf cast:					
Adelopus & Rhabdocline	Douglas-fir	Regionwide where host occurs.	Widespread and variable.	Severe, but variable.	None yet; spray being tested.
Lophodermium	Pines	Vermont & Maine	Limited	Spotty--light to severe.	None.

Cytospora canker	Various conifers; spruces give most concern.	Throughout Northeast	General	Mostly light to moderate.	Sanitation cuttings; proper thinning; method of stimulating growth rate; good sites.
Tympanis canker	Red pine	New York, occasional in Northeast.	Scattered	Light	Thin stands; release cutting.
Dothichiza canker	Poplars; Lombardy varieties most susceptible.	Throughout Northeast	Localized	Severe to moderate.	None practical; avoid susceptible species.
Eutypella canker	Maples	Regionwide	Scattered	Light-occasional	None.
Nectria canker	Hardwoods, maples, birch, beech & aspen very susceptible.	Regionwide	General	Severe to light	None satisfactory; losses reduced by stand improvement in stands less than 30 years old.
Septoria canker	Poplars; some hybrids very susceptible.	Where hosts occur.	Scattered	Severe on susceptible spp. & hybrids.	None practical.
Black knot	Black cherry	Regionwide	Widespread	Severe to moderate.	None practical; sanitation cuttings in commercial stands helpful.
Bleeding canker	Sugar maple	Regionwide	General-common	Moderate; fewer reports in 1958 than usual.	None.
	Douglas-fir	Near Bristol, Connecticut	Very local	Slight	None; cause unknown.
	Eastern white pine	New York	Localized	Slight (?)	None.

(continued)

Table 1.--(continued)

Disease	Host	Locality affected	Extent	Degree of infection or damage	Recommended control action
Hymenochaete canker	Red maple	Bartlett Experimental Forest, New Hampshire	Local	Slight; on young trees	None; possible stand improvement by elimination.
Rot canker	Oak, maple, birch, & other hardwoods	Regionwide, but oak infections especially noted in southern Maine and southern New Jersey.	Scattered	Severe in commonly burned areas, or where tree borers are common.	Prevention of tree wounds, fire, and insect injury
Rust-caused stem canker	Atlantic white cedar	Coastal plain of southern New Jersey.	Scattered	Moderate	None except selective cutting.
	Shortleaf & pitch pine	Same as above.	Localized	Generally light; severe infection spots.	None.
	Loblolly pine	Lebanon State Forest, New Jersey.	Very local	Slight to moderate.	None.
Fomes root rot	Conifers	Regionwide	Widespread in recently thinned stands.	Usually moderate; many new locations & hosts reported in 1958.	None, as yet; wider spacing & maintenance of rapid growth believed helpful.
Armillaria root rot	All species.	Regionwide	Widespread, common, scattered.	Severe in otherwise weakened trees.	Maintenance of vigor.
Heart rot	Oak & maple	New England states & southern New Jersey.	Scattered	Moderate to severe on oaks in southern Me. & N.J.; also street trees in New England states.	None; reduction of tree wounds would be beneficial.

Miscellaneous rot	Most conifers	Throughout Northeast.	Scattered	Light in young stands; heavy in overmature stands.	Early harvest.
Witches' broom	Wild cherry	Regionwide	General	Slight	None.
	Atlantic white cedar	Southern New Jersey & West Appleton area of Maine.	Common	Moderate	Selective cutting, when feasible.
	Shortleaf & pitch pines	Lebanon State Forest, New Jersey	Scattered, spotty	Light	None.
	Balsam fir & spruce	New England states & New York.	Scattered	Very little	None.
	Willows	South-central New Hampshire	Very local	Slight	None.
	Vaccinium	New Hampshire & Massachusetts	Localized	None	None.
Dutch elm disease	American elm	Regionwide	Widespread, general	Severe, an increase in 1958.	Spray for insect vectors; sanitation, prompt removal of infected trees.
Cephalosporium wilt (Dothiorella)	American elm	Regionwide	Common	Slight; Maine reported decrease in confirmations in 1958.	None.
Verticillium wilt	Elm & maple	Regionwide	General	Moderate to severe; increased in 1958.	None.
Phloem necrosis	American elm	West Virginia	Limited (?)	Not reported.	Spray for insect vectors; sanitation, prompt removal of infected trees.

(continued)

Table 1.--(continued)

Disease	Host	Locality affected	Extent	Degree of infection or damage	Recommended control action
Mimosa wilt	Mimosa	Delaware	Sussex County	Damage reported increasing.	Removal; use resistant varieties.
Oak wilt	Oak, especially those of red oak group	Maryland (Washington, Cumberland & Garrett Counties)	Scattered spot infections in northwest part of Maryland	No late reports.	Poisoning trees within 50-foot radius; removal of infected trees.
		Pennsylvania (south-central)	335 oak wilt areas reported in 1958, of which 87 were single tree infections.	Potential damage great.	Poisoning trees within 50-foot radius; removal of infected trees.
		West Virginia (general with heaviest infections in northeast & southwest parts of state)	Infected trees in 35 counties, but not in 11 counties where infected trees were previously found; 2 new counties added in 1958. 1448 suspected trees processed.	Variable severity, damage light to severe.	Deep girdle method of control used and recommended.
Oak mortality (not oak wilt)	Oaks, with most damage to red & black oak.	Throughout Northeast	General	Slight-heavy. Most mortality in W. Va., north-central Pa., & southern N.Y. More reports from Conn., N.J., Del., & Md. Apparent increase following 1957 drought.	Salvage, where feasible.

Sweetgum blight	Sweetgum	New Jersey, Delaware, & Maryland	Scattered	No late reports; may be increasing.	None.
Ash dieback	White ash	New England states & New York	General	Usually slight to moderate; apparently increasing.	None--cause uncertain.
Dying & dead hemlock	Hemlock	Cook Forest, Pennsylvania & Massabesic Forest, southern Maine	Localized	Slight; may be more serious & widespread than now realized.	None--cause unknown.
Wind damage	Miscellaneous	West Virginia & Allegash region in Maine	Localized	Strip of forest 19 mi. long & $\frac{1}{4}$ mi. in average width flattened in Maine.	None--Maine reported salvage not practical.
Winter injury	Oak, nursery stock, & pine	West Virginia, Washington Crossing nursery in New Jersey, & recent outplanting in southern New Jersey	Localized	Fluxing frost seams in West Virginia. Oaks, outplanted pines from southern seed source killed in southern N.J.	None.
Frost damage	Various trees, mainly oak & balsam fir	Southern New Jersey & southern Maine	Localized	Slight	None.
Snow damage	Atlantic white cedar, loblolly pine	New Jersey (coastal area)	Localized	Heavy limb breakage on white cedar & loblolly pines over 10 ft. tall.	None.
	Arborvitae, red pine, white pine	Maine	Localized	Arborvitae & red pine in plantations, and thinned white pine; total damage slight.	None.

(continued)

Table 1.--(continued)

Disease	Host	Locality affected	Extent	Degree of infection or damage	Recommended control action
White pine needle blight	White pine	New Hampshire & Maine	Scattered	Moderately severe in parts of N.H.; light in Maine, less than usual.	None
Resinosis	White pine	New York (Champlain Valley & southern tier of counties)	Localized	Mortality associated with resinosis in Champlain Valley, New York.	None--cause undetermined.
Chlorosis	Pin oak	Pennsylvania	Scattered	Slight	None, usually; if bad, use Ferrous spray.
	Spruce, fir, red & white pines	Maine	Localized (?)	Some patches 2 acres in extent.	
Dwarf mistletoe	Red & white spruce	Maine	Coastal strip in Brunswick-Ellsworth area	Moderate (?)	Under study--none, as yet.
Bird (Grosbeak) damage	Scotch pine & other conifers	Northern New York state	Common & widespread throughout New York & New England.	Moderate; loss of terminal buds in Christmas tree stock may be serious.	None.

Table 2.--The forest insect situation in the Northeast, 1958

MAJOR FOREST INSECTS

Insect	Host	Locality affected	Extent	Degree of infestation	Recommended control action
Spruce budworm	Balsam fir; white, red, & black spruces	Maine (northern)	1,012,000 acres	Light-heavy	None.
Balsam woolly aphid	Balsam fir	Maine, New Hampshire, Vermont, New York, (Adirondacks)	General distribution	Light-heavy; severe stem attack currently in Me., N.H., & Vt.; increased gout injury in coastal areas of Maine.	Sanitation-salvage cuttings where feasible; shortened rotation.
Pine sawflies	All pines	Regionwide	Most species localized; Virginia-pine sawfly 327,000 acres in Md.; pitch-pine sawfly over 1 million acres in New Jersey.	Light-heavy, red-headed pine sawfly apparently on increase.	Spray with DDT where feasible; use virus spray, if available, for European pine sawfly.

(continued)

Table 2.--(continued)

Insect	Host	Locality affected	Extent	Degree of infestation	Recommended control action
European pine shoot moth	Red, Scotch, & mugo pines	Regionwide, except northern New England and New York.	General distribution	Light-heavy	Where feasible, 2-3 applications of DDT with ground equipment beginning at moth emergence.
Nantucket pine tip moth	Loblolly, Virginia, & other pines	Massachusetts (Cape Cod), Connecticut, southwestern New York, New Jersey, Delaware, Maryland, West Virginia.	General distribution	Light-heavy, most serious in eastern Maryland.	Where feasible, multiple applications of DDT with ground equipment beginning at moth emergence.
White-pine weevil	White pine, Norway spruce, & other conifers	Regionwide	General distribution	Light-heavy, apparent increase in some areas.	Knapsack spraying of DDT or lindane with extender in small areas in early spring; helicopter spraying of DDT where feasible.
Red-pine scale	Red pine, several ornamental pines	Connecticut (southeastern) and New York (southeastern), including Long Island.	Main body of infestation 150+ sq.mi. in Bridgeport-Easton area; other spot infestations in southeastern Conn. & New York.	Light-heavy, tree mortality at Stamford, Connecticut.	Destroy infested trees.

Pales weevil	Young conifers	Regionwide	Localized	Light-heavy	Do not replant for 2 years after cutting. Spray seedlings with lead arsenite or 2% aldrin emulsion. Dip tops in 1% BHC suspension before planting.
Gypsy moth	Hardwoods, white pine, & hemlock	New England, central & eastern New York, northeastern Pennsylvania, northern New Jersey.	General distribution	Light-heavy	Airplane spraying with DDT; mist blower applications where feasible.
Orange-striped oak worm	Oaks, other hardwoods	Regionwide	Generally localized, extensive in southeastern Conn. & R.I.	Light-heavy, most serious in Conn. & R. I.	Spray with DDT where feasible.
Forest tent caterpillar	Aspen, sugar maple, & other hardwoods.	New England, New York, Pennsylvania, West Virginia	Localized	Light-heavy, apparent increase in W. Va. & Pa.	Spray with DDT where feasible.
Variable oak leaf caterpillar	Oaks	Delaware, eastern Maryland	General distribution	Light-heavy, apparent new outbreak in Cecil County, Maryland.	None.
Beech scale	Beech	Maine, New Hampshire, Vermont, New York	General distribution	Light-heavy	Sanitation-salvage cutting where feasible.
		Pennsylvania	Spot infestation	Light, first State record.	Drench-spray infected trees with contact poison.

(continued)

Table 2.--(continued)

MINOR FOREST INSECTS

Insect	Host	Locality affected	Extent	Degree of infestation	Recommended control action
White-pine cone beetle	White pine	Regionwide	General distribution	Light-heavy	None.
Ips engraver beetle	Pines & other conifers	Regionwide	General distribution	Light-heavy	Avoid injury to residual trees in logging operations. Remove slash. Remove infested and high-risk trees where feasible.
Pine leaf aphid	White pine & red spruce (alternate hosts)	Northern New England, New York	Localized	Light-heavy	Spray with contact insecticide where feasible.
Pissodes approximatus	Conifers	Regionwide	General distribution	Light, most serious in Christmas tree plantings in Pennsylvania.	Destroy infested trees before larvae emerge. Avoid injury to residual trees during cutting operations.
Pine (and Saratoga) spittlebugs	Pines	Regionwide	Localized	Light-medium	Spray with DDT where feasible.
Pine needle miner	Pitch & shortleaf pine	New Jersey (southern)	Localized	Light-medium	None.
Larch sawfly	Eastern & Japanese larch	Maine, Pennsylvania	Localized	Light	None.

Balsam needle gall midge	Balsam fir	Maine (northeastern)	General distribution	Light-heavy, most serious in Washington County.	None.
Pine gall weevil	Red pine	Maine, New Hampshire	Localized	Light	None.
Turpentine beetles	Pines	Regionwide	Localized	Light-heavy	Avoid injury to residual trees in cutting operations; remove infested trees where feasible.
Yellow-headed spruce sawfly	Spruces	Maine	Localized	Light	None.
Pine twig gall scale	Pitch pine	Massachusetts (southeastern)	General distribution	Light-medium	None.
Fir tip sawfly	Balsam fir	Maine (northern)	General distribution	Light-heavy	None.
Pine twig borer	Scotch pine	Pennsylvania, New York	Localized	Light-medium	None.
Bagworm	Red cedar, black locust, other conifers & hardwoods	New Jersey, Delaware, Maryland, West Virginia, southern Pennsylvania	General distribution	Light	Spray with lead arsenate or toxaphene where feasible.
Walnut caterpillar	Black walnut	Delaware, Maryland, & Pennsylvania	Localized	Light-heavy	Spray with DDT where feasible.

(continued)

Table 2.--(continued)

Insect	Host	Locality affected	Extent	Degree of infestation	Recommended control action
Yellow-necked caterpillar	Oaks & other hardwoods	Delaware, Maryland, southern New Jersey	Localized	Light	None.
Red-humped oak worm	Oaks & other hardwoods	Regionwide	Localized	Light	None.
Looper, Phigalia	Hardwoods	West Virginia (northeastern)	2300 acres	Light-heavy	None.
Oak leaf roller	Oaks	Pennsylvania	Localized	Light-medium	None.
Fall cankerworm	Hardwoods	Regionwide	Localized	Generally light, more severe at spots in W. Va. & Pa.	None.
Saddled prominent	Beech, other hardwoods	New Hampshire (Bald Mountain)	500 acres	Heavy	None.
Spiny oak worm	Oaks	Regionwide	Localized	Light	None.
Maple leaf cutter	Sugar maple	Northern New England, New York	Localized	Light-heavy	None.

Fall webworm	Hardwoods	Regionwide	Localized	Light, less than in 1957	Spray with DDT where feasible.
Asiatic oak weevil	Oaks	Delaware, Maryland, southeastern Pennsylvania	General distribution	Light	None.
Gregarious oak leaf miner	Oaks	Massachusetts, Connecticut	General distribution	Light-heavy	None.
Locust borer	Black locust	West Virginia	General distribution	Light-heavy	None.
Oak twig pruner	Oaks	New York, Pennsylvania	General distribution	Light-medium	None.

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